STATE OF MONTANA
DEPARTMENT OF ADMINISTRATION
STATE PERSONNEL DIVISION

POSITION DESCRIPTION

ALLOCATION: To be completed after final classification approval by the State Personnel Division or by agencies with delegated classification authority:

Class Code	Title	Grade
019060	MATERIALS LAB TECH	10

*** PART I: Identification ***

CURRENT CLASSIFICATION:
Code: 019060 Title: Materials Laboratory Technician Grade: 10

AGENCY: Agency Code: 5401 Position Nos: 57050

Department	Division
Transportation	Glendive

Unit
District Lab

ADDRESS:

Building & Street	Room Number	City	Zip Code	Business Telephone
503 N River Ave		Glendive	59330	406-377-5296

FUNCTIONAL DESCRIPTION OF THE WORK UNIT:

The District and Area Materials Laboratories are responsible for supplying Design, Construction, and Maintenance necessary information on availability, quality, and quantity of materials used through site assessment, quality assurance and technical assistance services related to materials used in design, construction, and maintenance of the State's highways. District Materials personnel are responsible for sampling and testing, or submitting to the Materials Bureau, construction and site materials to provide information necessary to determine the scope of construction projects and materials needed, ensure compliance with State and Federal standards and Project Specifications, maintain required documentation, and provide technical assistance to contractor, construction, and maintenance crews in the design and application of construction materials.

*** Part II: Job Description ***

Position Overview:

This position is responsible for quality assurance and submittal activities related to sampling of construction materials; technical assistance activities related to running the Marshall trailer at construction sites; and testing and analysis of construction materials to ensure compliance with State and Federal regulations. This work involves the application of technical sampling and testing methods and procedures which vary dependant upon the type of material sampled and site characteristics. Duties include setting up test trailers and equipment at construction sites, collecting samples of a variety of materials, performing laboratory testing, and providing direction and guidance to employees with less experience. The position reports to the Area Lab Supervisor, and does not regularly supervise others.

The information on this job description has been designed to indicate the general nature and level of work performed by employees within this classification. It is not designed to contain or be interpreted as a comprehensive inventory of all duties and responsibilities required of all employees assigned to this job (i.e., it is not intended as a procedural manual, and employees may be required to perform some tasks not listed here). All duties documented below are considered essential to the position.

1. **ASSIGNED DUTIES**:

A. Collect samples of highway and bridge construction materials for testing. The position is 45%

responsible for collecting preconstruction samples in order to determine acceptability of materials and to provide Design information necessary to determine the scope of a project and materials needed, and is responsible for Quality Assurance/Independent Assurance of materials being used in construction to determine compliance with standards, provide information to the project manager (used to determine project change orders and incentives/penalties), and ensure consistency among labs in the state. This involves determining the nature of the sample to be collected (content/quantity) based on the type of material, determining where to collect samples based on construction site characteristics and the nature of the project, ensuring conditions (e.g., weather) are suitable for collecting representative samples, delivering and setting up test equipment and trailers, using proper traffic control activities for laboratory field sampling activities (e.g., auguring for a soil survey, or core drilling on the present traveled way), and ensuring samples are collected and labeled according to MDT guidelines. This work requires knowledge of sampling and laboratory testing protocols and procedures, state, federal, AASHTO, FHWA, and ASTM standards, project specifications, the Montana Materials manual, Montana Construction Manual, Standard Specifications for Road and Bridge Construction, highway construction methods and techniques, the properties and characteristics of materials components and a variety of site specific circumstances and their impacts (soils, temperature, weather conditions, gradations, segregation, stability, flows, additives, absorption rates, etc.). The work also requires skill in adapting sampling and testing methods and techniques to meet various site circumstances, skill in operating sampling and testing equipment (coring machine, auger truck, Gilson shaker, nuclear gauge, sieves, survey equipment,

other lab test equipment, etc.), and skill in operating office equipment used to calculate and record data (PCs, calculator, laptop computers, VAX system, etc.). Field sampling work is usually done under the general direction of a senior Materials Lab Technician, however, the position may occasionally be required to perform tasks independently.

1. Deliver and set up test trailer and equipment to ensure compliance with MDT and Federal safety and site standards, ensure efficient set up for monitoring construction activities and the collection and testing of samples, and ensure the safety of project staff. This involves determining the optimal site for the trailer to allow for efficient testing and observation of the hot plant by assessing site characteristics and conferring with the contractor and project manager, assessing power requirements and supplies, securing and leveling the trailer, and setting up/calibrating test equipment.

2. Establish traffic control systems (signing, flagging, etc.) or assist Construction or Maintenance crews in traffic control to ensure compliance with MDT, MUCTD, and Federal safety standards and ensure the safety of project staff and the traveling public. This involves determining how to set up signing and traffic control based on site characteristics (visibility for oncoming traffic, bridges, road grades, etc.) and applicable regulations, coordinating traffic control activities with the Highway Patrol (whenever possible), flagging, and performing other traffic control duties as directed.

3. Conduct preconstruction site surveys such as soil surveys (determining the compaction and quality of soil), gravel pit surveys (to identify sources of gravel, scope out the boundaries of the pit, contact landowners to discuss access), and testing of existing materials (sampling cores, stripping evaluation cores and plant mix failure cores, assessing condition of roadway testing site pipes or culverts for corrosion, rut measurement) in order to gather information relied upon by design crews to determine the scope of construction projects and the types of materials needed for the project. In addition to established sampling and testing methods, this work requires knowledge of survey methods and techniques, and skill in communicating with the public (landowners).

4. Reviews site characteristics, project plans, and engineering specifications to determine where and when to collect representative samples. This involves judgements on issues not specified in sample collection procedures (e.g., which roadway lane to sample from). This work requires the ability to assess site characteristics such as traffic flow, visibility, and road characteristics. The position also has to ensure conditions are suitable to collect good samples. They will have to assess additional site characteristics such as weather conditions (snow, rain, temperature, etc.), including varying degrees of conditions (light rain, heavy rain). They will have to make a determination as to whether or not to consult with the supervisor on whether the conditions are suitable for sampling. Exercise of independent judgement is required as the supervisor often isn't available on the site. The work must be done according to the MDT Materials Manual.

5. Collect samples, or oversee sample collection by contractors or lower level technicians, by applying a variety of technical sampling methods and techniques, operating a variety of sampling equipment, and considering the type of material to be sampled and unique site characteristics (may have to alter or adapt sampling methods due to site characteristics and conditions). The work involves solving problems related to collecting a sample (e.g., unique site characteristics which require adapting prescribed collection methods, observation of site circumstances which

may warrant further sampling and testing) using judgement, experience, and materials guidelines (for example, collecting samples of cured concrete requires drilling out a core). This random sampling requires judgement to ensure that you are not going to hit rebar, consulting with the construction crew to get clarification on the best place to drill (you don't want to try and drill through reinforced steel), and making required adjustments if rebar is encountered. Judgement is required to visually discern color, texture, rock content, and break at different soil horizons. It is important to be able to see the differences between the different levels. Samples must be collected or observed by MDT personnel in order to be considered an official sample. This work requires skill in operating a variety of sampling equipment (auger truck, coring machine, etc.).

6. Labels and prepares samples for submission to the area lab or Materials Bureau with appropriate documentation. The position (or a Senior Technician) may make determinations on quantities of materials, determine whether split sampling is required (based on the nature of the sample), and ensure samples are properly labeled and approved. These determinations are based on established national and MDT standards, and project specifications.

B. Apply materials testing methods to determine physical and engineering properties of materials such as sieve analysis of fine and course aggregate, specific gravity, strength, air content, and slump of concrete, liquid limit, plastic limit and plasticity index, moisture/density, density and voids, gradations, volume displacement/swell, Marshall testing, etc. This requires knowledge of materials inspection and testing procedures, the properties and characteristics of materials, national and state standards and methods, the ability to interpret results, construction plans, drawings, and specifications, and accurately perform mathematical computations. Although the supervisor and senior technicians may be available to provide technical assistance, technicians at this level are expected to perform the majority of testing procedures independently, and test results are normally assumed to be accurate. 35%

1. Determine procedure to follow based on the type of material sampled, and it's intended use. This involves reviewing plans and specifications, reviewing data collected at the site during sampling, and referring to procedures and acceptable limits in the Montana Materials Manual of Test Procedures.

2. Ensures that all lab and Marshall equipment is maintained in good working order and properly calibrated and adjusted, i.e., scales (manual and electronic), liquid limit device, proctor machine settings, molds (Marshall and concrete cylinders, proctor molds) etc. For example, you must check splitters to ensure fine materials which could contaminate a sample are not present; gradation screens must be checked for tears or deformations; liquid limit testing equipment - you must check the drop height; proctor (density) tests - ensure rammer height is correct; etc. The position makes necessary adjustments to equipment to ensure it is within specifications and accurate.

3. Prepare samples for testing based on the type of material, and procedures outlined in the manual. This involves technical processes such as preparing molds, pouring concrete cylinders, weighing, washing, shaking, crushing, and splitting samples. This involves observations as to the height, width, volume, dryness and other physical properties of the sample, and making adjustments as needed (e.g., extending drying times, reshaking, etc.). Accuracy is critical in all tasks. District Materials technicians are expected to perform preparation tasks independently,

and perform the full range of materials testing procedures.

4. Conduct a wide variety of specialized testing procedures on materials. This work involves following detailed procedures outlined in the materials manual for tests such as sieve analysis, specific gravity, compaction, moisture content, density, liquid limit, plastic limit, plasticity index, slump and air content of concrete, the Marshall method, SHRP procedures, determining voids, etc. The work at this level also involves making many judgements in the application of procedures. For example, if material test results are out of specifications, the position will be required to determine if the result was due to poor materials, improperly functioning equipment, or operator error. The position may provide recommendations as to whether further sampling and testing are required, or may determine that additional split sampling (beyond that mandated by IA/QA standards) is required.

5. Calculate and summarize test results, compares final results to specifications, and creates a record of testing results by entering information on appropriate forms or into the computer. This work involves the application of conversion factors and tables, algebraic equations, noting deviations from standard specifications, and giving explanations of failing test results. The technician does not make final determinations on the quality of materials, but is expected to provide observations as to why a material failed.

C. Provide training and guidance to staff with less experience such as other Materials Technicians, 15%

field construction crews, and Materials staff in materials sampling, testing methods and techniques. Observe materials, contractor, and other staff (e.g., maintenance) at the site to determine compliance with established methods and techniques, and sampling and recording requirements. Notify staff or appropriate supervisor of improper practices or safety concerns. Assist senior lab personnel in conducting annual/biannual training or engineering crew personnel. This training consists of soils identification, test procedures, and QA system review. Participate in and conduct safety meetings. This work requires an extensive knowledge of sampling and testing methods and techniques, safety considerations, and on the job training methods and techniques.

D. Maintain and repair field and laboratory equipment used for the collection, sampling, and testing of materials to ensure safety, accurate results, proper operation, cost containment, and to extend useful life. This involves a variety of processes including routine vehicle maintenance, lubrication of sampling equipment, checking for specifications and tolerances, replacing worn or damaged parts, determining the condition of equipment and need for repair or replacement, and forwarding recommendations to Shop Supervisor, throughly detailing repairs needed. Follows up on status of repairs in progress. 5%

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2. **<u>WORKING CONDITIONS AND PHYSICAL DEMANDS</u>**:
Essential functions involve significant physical demands related to repeated lifting of up to 80 pounds (and occasionally greater weights), carrying equipment and samples over rough terrain, climbing and bending to retrieve samples, operating gas, diesel, and electrically powered equipment, extensive overnight travel throughout the District in excess of 2,000 miles per month (often on short notice, weekends and holidays), and working in outdoors in all types of weather.

The work environment involves harsh or caustic fumes, dust, extreme temperatures, wind, rain, and snow. Hazards associated with the work can be significant. The majority of the work is performed at construction sites or fabrication plants involving traffic passing the work site and working around heavy machinery such as front end loaders, pavers, scrapers, rollers, and forklifts. The work also involves and risks associated with working with hazardous materials such as radioactive materials (in densimeter gauges), hot asphalt, lime, acids, and other chemicals.

The risks of the work are such that extensive training in safety practices and procedures is required. Due to the nature of work elements (hot asphalt, heavy equipment, etc.) and hazardous tasks such as taking samples from hot plants or observing concrete beam fabrication, potential for injury may be significant.

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3. **KNOWLEDGE, SKILLS, AND ABILITIES**:

The position requires knowledge of materials inspection and testing procedures, the properties and characteristics of a variety of materials, sampling and laboratory testing protocols and procedures, state, federal, AASHTO, FHWA, and ASTM standards and project specifications, the Montana Materials manual, Montana Construction Manual, Standard Specifications for Road and Bridge Construction, highway construction methods and techniques; safety practices and procedures including MUTCD procedures for traffic control; and on the job training methods. The work also requires skill in adapting sampling and testing methods and techniques to meet various site circumstances, skill in operating a variety of sampling and testing equipment (core drills, auger trucks, Gilson shakers, nuclear gauges), and the ability to accurately perform mathematical computations, modify test procedures as changes to these procedures are made, to learn and apply new SHRP procedures as these are adopted by MDT, to analyze and interpret test results to determine accuracy of testing; and observe site conditions and determine their affect on the testing process.

The required Knowledge, Skills and Abilities are typically acquired through a combination of education and experience equivalent to graduation from high school and at least two years experience in highway and bridge construction materials sampling and testing.

The position also requires having, or the ability to attain, a Class B Type 2 Commercial Driver's License.

4. **MANAGEMENT and SUPERVISION of OTHERS**:

This is a non-supervisory position. The position may assist the Area Lab Supervisor and Senior Technicians in training lower level technicians and aides, and provides direction and guidance to employees with less on the job experience in materials sampling and testing.

5. **SUPERVISION RECEIVED:**

The position reports to the Area Lab Supervisor, and the District Materials Supervisor. The work is structured by established MDT materials sampling and testing methods and procedures. This level of technician is expected to apply these procedures and methods independently, and is occasionally required to use judgement in activities such as determining where to collect samples or determining if further testing or splitting of samples is required. Higher level Lab Technicians are available to provide technical assistance, and usually provide supervision with regard to specific assignments on construction sites. References available are the Montana Materials Manual of Test Procedures, Montana

Construction Manual, Standard Specifications for Road and Bridge Construction, project specifications, plans, and engineering designs, FHWA, AASHTO, FHWA, and ASTM standards. Results of testing are assumed to be accurate, but the work is reviewed by the supervisor prior to final approval.

6. **SCOPE and EFFECT:**

Actions directly affect the accuracy of sampling and testing of materials used in highway and bridge construction in conformance with established MDT, national, and project specifications and criteria. Decisions related to ensuring accuracy and consistency in the application of testing procedures have a significant impact on the project. Results of IA testing ensure consistency of lab results statewide (at the project, District Lab, and Helena Lab). Decisions regarding the compliance of materials with project specifications affect the accuracy of data relied upon by the project manager to determine materials acceptance and necessary change orders, and incentives or penalties which have a significant economic impact on the contractor.

7. **PERSONAL CONTACTS:**

Contacts are with other MDT staff to discuss technical information such as testing procedures or sampling methods. Information such as or explaining noncompliance issues requires interpretation. Coordinating activities at a construction site, monitoring contractors for compliance, and notifying individuals of improper practices requires tact and diplomacy. The position may involve diffusing potentially hostile situations. The work also involves contacts to provide training and direction to other project staff which requires the ability to adapt information to others' levels of understanding, and to determine if the individual is understanding instructions. The work also involves contacts with landowners to negotiate exploration for construction materials (e.g., gravel pits) at the site, and to ensure positive public relations for the MDT.

***PART III: Signatures ***

IMMEDIATE SUPERVISOR

To the best of my knowledge, the statements in Parts I and II are accurate and complete.

Signature: (Signed) Date: 12/13/00

Name: Roger Warner Title: District Materials Supervisor
(Please Print)

ADMINISTRATIVE REVIEW

Signature: (Signed) Date: 12/15/00

Name: William L. McChesney Title: District Administrator
(Please Print)

Agency Director
or Designee:

Signature: (Signed) Date: 1/04/01

Name: Jean Bond Title: Chief, Employee Relations Bureau
Human Resources Division
(Please Print) (Please Print)

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